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## Acute fulminant neuropathy in a patient with Churg–Strauss syndrome

KKP Ng, HM Yeung, KT Loo, HM Chan, CK Wong, PCK Li

### Summary

**We report a patient with an acute neuropathy initially mimicking Guillain–Barré syndrome, both clinically and electrophysiologically. Persistent eosinophilia, positive antineutrophil cytoplasmic antibody and eosinophilic vasculitis in sural nerve biopsy later confirmed Churg–Strauss syndrome. Since vasculitic neuropathy can present in an acute and fulminant form, the role of early antibody testing and sural nerve biopsy in atypical cases of acute neuropathy is emphasized.**

**Keywords:** Churg–Strauss syndrome, allergic granulomatous angiitis, neuropathy, Guillain–Barré syndrome

The peripheral nervous system is commonly involved in systemic vasculitic diseases such as polyarteritis nodosa, Churg–Strauss syndrome, Wegener's granulomatosis and cryo-

globulinaemia. The incidence can be greater than 75%.<sup>1</sup> Presentation is usually as mononeuritis multiplex, asymmetrical polyneuropathy, chronic distal symmetrical sensory or sensorimotor polyneuropathy.<sup>1–4</sup> An acute fulminant involvement of all peripheral nerves in the early phase of illness is rarely reported.

### Case report

A 58-year-old man had late-onset asthma for the past two years which was well controlled with a regular inhalational bronchodilator. He enjoyed good health otherwise. For six weeks before admission, he had had general malaise, night sweating, low-grade fever and weight loss. His general practitioner diagnosed pulmonary tuberculosis following a chest X-ray which showed bilateral apical infiltrates. He received anti-tuberculous drugs but stopped taking them after three days because of gastrointestinal upset. He was then admitted

**Table** Results of nerve conduction study on day 3

Nerve	DML (ms)	CMAP (mV)	MNCV (m/s)	Conduction block	F-wave	SNAP ( $\mu$ V)	SNCV (m/s)
R median	3.7	4.9*	52	absent	normal	10	45
L median	3.9	2.3*	–	complete	absent	3*	46
R ulnar	2.6	1.1*	48*	absent	absent	4*	48
L ulnar	3.2	11.0	52	absent	prolonged	5*	46
R peroneal	3.5	0.6*	42	absent	prolonged		
L peroneal	4.2	1.3*	41	partial	absent		
R posterior tibial	6.3	0.07*	60	partial	absent		
L posterior tibial	5.1	0.7*	41	partial	absent		
R sural						7	57
L sural						13	50

Abbreviations: R=right; L=left; DML=distal motor latency; CMAP=compound muscle action potential amplitude; MNCV=motor nerve conduction velocity; SNAP=sensory nerve action potential amplitude; SNCV=sensory nerve conduction velocity; \*abnormal values

Department of  
Medicine, Queen  
Elizabeth Hospital,  
Kowloon, Hong Kong  
Division of  
Neurology  
KKP Ng  
HM Yeung  
HM Chan  
CK Wong  
PCK Li  
Department of  
Pathology  
KT Loo

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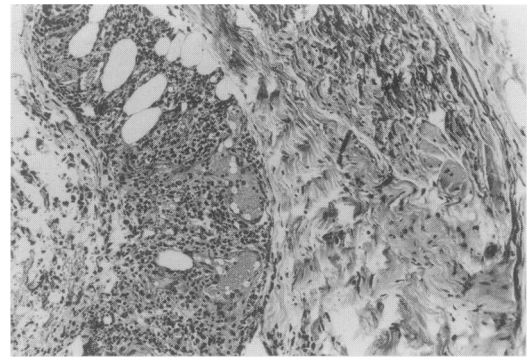
into hospital for progressive weakness of limbs over two weeks which rendered him unable to walk for two days. Numbness was present in the extremities. There was no bulbar or sphincter disturbance.

Physical examination showed an afebrile, conscious and alert man with intact cranial nerves. Motor examination showed a symmetrical decrease in muscle power: upper limbs – wrist flexors and extensors (grade 3), small hand muscles (grade 2), elsewhere in upper limbs (grade 5); lower limbs – hip, knee and ankle extensors (grade 5), hip and knee flexors (grade 4), ankle flexors and foot muscles (grade 3). Tendon reflexes were hyporeflexic in the upper and areflexic in the lower limbs. Sensory examination showed a glove and stocking loss of pinprick sensation; proprioceptive sense was absent in the toes. The patient was able to stand with support. Forced vital capacity was 1.59 litre. Examination of the blood pressure, skin, cardiovascular system, chest and abdomen were normal.

He continued to deteriorate and, by day 2 of hospitalization, could not stand. The results of a nerve conduction study on day 3 are shown in the table. Electromyography showed active denervation changes in the proximal and distal muscles of both upper and lower limbs. Cerebrospinal fluid (CSF) examination showed white blood cells  $<1 \times 10^9/l$ , red blood cells  $4 \times 10^9/l$ , protein 0.18 g/l, glucose 4.8 mmol/l (serum glucose 9.4 mmol/l) with no organisms grown. Blood investigations showed haemoglobin 11.6 g/dl, platelets  $524 \times 10^9/l$ , white blood cells  $21.6 \times 10^9/l$ , erythrocyte sedimentation rate (ESR) 113 mm/h, normal liver and renal function tests except increased globulin (40 g/l) and decreased albumin (27 g/l). Chest X-ray still showed bilateral apical infiltrates.

With the features of demyelination in nerve conduction study and the CSF findings, a diagnosis of probable Guillain–Barré syndrome was made and five sessions of plasmapheresis were given from day 4 on alternate days. Anti-tuberculous drugs were restarted for the lung infiltrates, with a presumptive diagnosis of pulmonary tuberculosis. His condition stabilised after plasmapheresis; on day 7, examination revealed an increase of his left wrist power to grade 4; other muscles and tendon reflexes remained the same. A low grade fever of 37.5–38.5°C and sinus tachycardia of 120 beats/min developed and persisted after admission. Persistent peripheral eosinophilia ranging from 47 to 65% ( $11.8–20.6 \times 10^9/l$ ), and elevation of ESR and serum globulin were also noted. Other investigations showed HB<sub>s</sub>Ag and ANF negative, rheumatoid factor positive, C-reactive protein 87.7 mg/l (normal  $<8$ ), normal IgA and IgG but IgM 0.34 g/l (normal 0.63–2.77 g/l). Echocardiogram showed a mild global myocardial dysfunction with a small pericardial effusion. Lung function test showed a restrictive pattern.

On day 17, his right wrist power decreased to grade 2. A repeated nerve conduction study on day 18 revealed non-excitable nerves in all four limbs. Sural nerve biopsy on day 22



**Figure** Sural nerve biopsy. Granuloma replacing blood vessel (right) in perineurium of sural nerve seen adjacent to nerve fascicles with prominent eosinophilic infiltration (left) (Haematoxylin & Eosin)

### Learning/summary points

- systemic vasculitis, including Churg–Strauss syndrome, can present initially as an acute fulminant generalised neuropathy
- features of demyelination in nerve conduction study can be seen in vasculitic neuropathy
- fever, prominent sensory signs, peripheral eosinophilia and involvement of other organs are uncommon in Guillain–Barré syndrome
- a positive ANCA titre points towards a diagnosis of vasculitic neuropathy

showed an extensive active demyelination and its vasa nervosa was involved by granulomatous inflammation with prominent eosinophilic infiltration (figure). Subsequent antineutrophil cytoplasmic antibody (ANCA) titre was positive at 1:20 with a perinuclear uptake pattern (pANCA) and myeloperoxidase level was 100% (normal  $<3.9\%$ ). He then developed acute respiratory failure due to pulmonary haemorrhage and required mechanical ventilation. A diagnosis of Churg–Strauss syndrome was made and plasmapheresis was restarted on day 24, pulse intravenous methylprednisolone was given at 1 g daily for three days from day 25, and oral cyclophosphamide 100 mg/day from day 29. Despite the aggressive treatment, the patient developed acute renal failure requiring haemodialysis, paralytic ileus with fresh rectal bleeding (rectal biopsy showed glandular atrophy and lamina propria fibrosis indicated the presence of ischaemia) and convulsions. His clinical course was further complicated by pneumonia and urinary tract infection. He finally succumbed on day 79.

### Discussion

Retrospectively, our patient satisfied the diagnostic criteria of Churg–Strauss syndrome<sup>5</sup> with a prodromal phase of asthma, an infiltrative phase of pulmonary infiltrates, and a vasculitic phase involving the peripheral and central nervous system, heart, lungs, kidneys and gastrointestinal tract, supported by peripheral eosinophilia, positive pANCA and characteristic sural nerve biopsy findings. However, most of these features of the full-

blown syndrome were not evident at the presentation of his generalised neuropathy. Unfortunately, his apical lung infiltrates, ill health, fever and raised ESR were initially thought due to pulmonary tuberculosis in an endemic area. His acute generalised neuropathy was initially thought to be Guillain-Barré syndrome which has been previously reported to develop after pulmonary tuberculosis. This presumptive diagnosis was further supported by the features of demyelination in nerve conduction studies. Nevertheless, prominent sensory signs, persistent peripheral eosinophilia and fever were atypical, and the involvement of other organs is not seen in Guillain-Barré syndrome.<sup>6</sup>

The correct diagnosis was helped by the positive blood test for ANCA and characteristic findings on sural nerve biopsy. In vasculitic neuropathy, features in the nerve conduction study suggestive of demyelination, such as absent or prolonged F-wave responses,

the presence of intermediate conduction blocks and slow motor conduction velocities have been reported and are attributed to ischaemia.<sup>7,8</sup> CSF examination is usually normal in vasculitic neuropathy and the early phase of Guillain-Barré syndrome.<sup>6</sup> In differentiating a vasculitic neuropathy from Guillain-Barré syndrome, there may be difficulties in arriving at a correct diagnosis in the absence of other clinical features of vasculitis or when only atypical features are present. Although not diagnostic of vasculitic neuropathies,<sup>9</sup> a positive blood test for ANCA is present in more than 60% of patients with Churg-Strauss syndrome<sup>10</sup> and, together with positive sural nerve biopsy findings, this helps to confirm the diagnosis of vasculitic neuropathy earlier, guide the treatment and improve the prognosis of the patient. We therefore recommend conducting a blood test for ANCA and early sural nerve biopsy in atypical cases of acute neuropathy.

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